

Scaling out impacts: A study of three methods for introducing forage technologies to villages in Lao PDR

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Foreword

Most of the population in the upland areas of Lao PDR live in rural households and villages where they practise shifting agricultural cultivation.

The International Center for Tropical Agriculture (CIAT), with funding from AusAID and research support from ACIAR has been involved in research and extension aimed at increasing livestock production and livelihood security through the cultivation of fodder crops. These tropical grasses and legumes provide a daily source of feed that allows more intensive and secure livestock raising, which is showing signs of breaking the poverty cycle and laying the foundation for sustainable village economies.

The Forages and Livestock Systems Project (FLSP) is allowing households to run more livestock that can also be housed close to or in the village where their security, conditioning and health can be better managed.

Once the successful technologies are established, the issue is how to disseminate the information on a wider scale. Over the last five years FLSP has introduced new forage varieties and animal husbandry practices to more than 100 villages and 1350 farmers. As the project has expanded, the challenge has been to move beyond simply trialling new technologies with farmers on a small scale to enabling significant livelihood impacts across larger numbers of households, villages and districts (a process known as scaling out). An ACIAR project was developed to assist with trialling and researching methods for scaling out technologies and their impacts. This report contains the results of a study to examine the effectiveness of three participatory extension methods for scaling out forage and livestock technologies to new villages, which was undertaken as part of the ACIAR project. The results will be of interest to development workers, extension workers and researchers with an interest in participatory research. This working paper is also available as a freely downloadable document at www.aciar.gov.au.



Peter Core

Director

Australian Centre for International Agricultural Research

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We would like to acknowledge the provincial and district agriculture and fisheries officers as active partners in this research — for their enthusiasm and dedication to finding ways to scale out forages, their efficiency in selecting villages and liaising with farmers, organising logistics (not an easy task during the wet season!) and for their participation in the interviews. In particular we would like to thank Mr Somvanh Phommali and Mr Bounthavone Songkhalai from Xieng Ngeun district, Ms Chanhsouk Chanhtanoun from Pak Ou district, Ms Thongbay Siesomphone and Mr Somsak Inthasone from Luang Prabang district, Mr Viengsuk Lorbriayao and Mr Khamphone Boulavong from Pek district, Mr Kuthao Pialouang and Ms Chongpeth Phomvisay from Nonghet district, Mr Soulideth Phraponsay from Luang Prabang provincial office and Mr Khampai Phommavong from Xieng Khouang provincial office (PAFEC). Translation was capably provided by Mr Senpasith Thongsavath from PAFEC, Luang Prabang and Mr Viengxay Photakoun, NAFES, Vientiane. Ms Bouathong Keola from NAFES and Ms Kim Alexander from CSU assisted with note taking and data collection. We are especially grateful to the farmers and village heads who generously gave their time and hospitality to the research teams.

Glossary

ACIAR	Australian Centre for International Agricultural Research
AIRP	Accelerating the Impacts of Participatory Research and Extension Project
AusAID	Commonwealth Agency for International Development
CIAT	International Center for Tropical Agriculture
CSU	Charles Sturt University
DAFEO	District Agriculture and Forestry Extension Office
FLSP	Forages and Livestock Systems Project
LAO PDR	Lao People's Democratic Republic
NAFES	National Agriculture and Forestry Extension Service
NAFRI	National Agriculture and Forestry Research Institute
PAFEC	Provincial Agriculture and Forestry Extension Centre
SADU	Smallholder Agroenterprise Development in the Uplands

1. Executive summary

The ACIAR-funded project *Accelerating the Impacts of Participatory Research and Extension on Shifting Cultivation Farming Systems in Lao PDR* (AIRP) has been working in Lao PDR since 2003 to research ways to scale out technologies using participatory approaches with upland farmers. The AIRP involves research collaboration between Charles Sturt University, the National Agriculture and Forestry Extension Service (NAFES) and the International Center for Tropical Agriculture (CIAT) Asia office.

This report details the results of a study undertaken in 2004 to research the effectiveness of three participatory extension methods for scaling out forage and livestock technologies to new villages. Action research methodology was used to maximise involvement of Lao government staff and build their capacity to facilitate the scaling out process. The three extension methods selected were based on their relative success to date and staff familiarity with each method. They included case studies presentations using photos and sketches; cross visits to one or more villages with significant impacts; and champion farmer visits to new villages.

A total of 53 new villages were involved in at least one of the methods. Nine villages (15% of total villages involved) were randomly selected for farmer interviews, comprising three villages for each method across different districts (six villages in Luang Prabang province and three villages in Xieng Khouang province). For each village, the district staff and the village headman or group leader were asked to select three farmers who had planted forages that year (active) and three farmers who had not planted forages (non-active). All farmers were to have been present at the case study meeting, cross visit or village feedback, or champion farmer visit meeting.

Cross visits were found to be more effective in creating informed awareness and confidence in trialling forages than case study presentations or champion farmer visits. Cross visits were also the preferred learning method for most of the farmers interviewed as they were able to see the technology being used and interact with the host farmers. Farmers were able to immediately apply what they had learnt due to the practical knowledge (and in some cases planting material) they had acquired.

Case study presentations extended awareness to more people though farmers expressed the need for more technical and practical information to accompany or follow case studies. Visits by champion farmers were not as effective or popular for farmer learning as cross visits but were the preferred learning method for farmers not wanting to travel or learn in groups. These farmers preferred to work one to one with experienced farmers or district staff, in a step-by-step fashion.

Interviews and workshops with district staff revealed that although most staff acknowledged that cross visits had been effective in stimulating farmer learning and adoption, they were also aware that many other factors also influence farmer willingness and capacity to engage in and benefit from a new technology. The challenge for extension staff is to design the right mix of extension methods based on the strengths and weakness of each method at every stage of farmer learning depending on the characteristics of each village and farmer group.

2. Background

This study was undertaken by the ACIAR-funded project *Accelerating the Impacts of Participatory Research and Extension on Shifting Cultivation Farming Systems in Lao PDR* from April to October 2004. The aim of the study was to research the effectiveness of three participatory extension methods for scaling out proven forage and livestock technologies to new villages in the uplands of Lao PDR. Proven technologies are those that have been tested and adapted by farmers already and shown to be beneficial. Action research methodology was used to maximise involvement of Lao government staff and build their capacity to facilitate the scaling out and adaptation of beneficial technologies. The project involves research collaboration between Charles Sturt University, the National Agriculture and Forestry Extension Service (NAFES) and the International Center for Tropical Agriculture (CIAT) Asia office.

The research was conducted in partnership with the AusAID-funded 'Forages and Livestock Systems Project' (FLSP) which has been using participatory research and extension approaches to develop forage and livestock technologies with farmers in northern Lao PDR (Horne and Stür 2003; Connell et al 2004; Horne 2005). The FLSP started working in the uplands of Luang Prabang and Xieng Khouang provinces in July 2000 with three main objectives to improve livelihoods and local environments:

- ▶ improve productivity of small and large animal systems
- ▶ increase labour efficiency and reduce workloads in livestock production
- ▶ enhance sustainable cropping systems through improvements in soil fertility management and reduction in soil erosion.

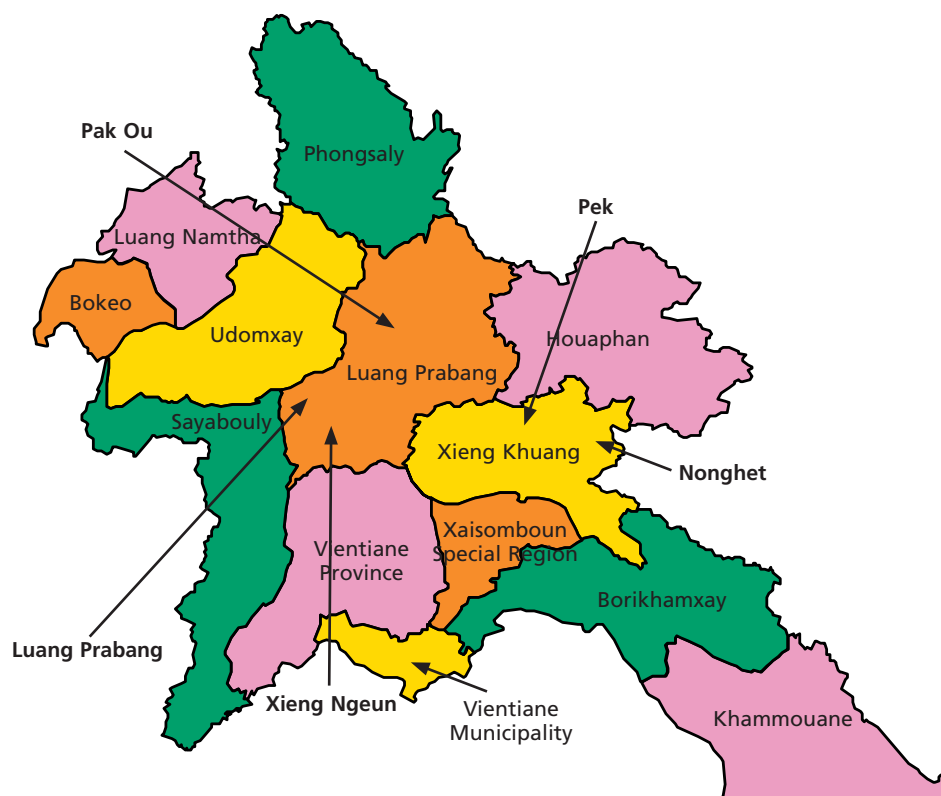


Figure 1. Location of districts in northern Lao PDR

The Forages and Livestock Systems Project was managed by CIAT Asia and the National Agriculture and Forestry Research Institute (NAFRI). On-ground delivery of technical support and extension to farmers is provided by the provincial and district agriculture and forestry offices in both provinces. The FLSP has been working with villages in the districts of Xieng Ngeun, Luang Prabang, Pak Ou, Pek and Nonghet (see Figure 1).

Over the last five years (2000 to 2005), FLSP has introduced new forage varieties and animal husbandry practices to a total of 106 villages and 1350 farmers. Most of these farmers (65%) have been able to improve the productivity of their small and large animal systems, increase labour efficiency, improve soil fertility, reduce soil erosion, and increase cash income. About half (51%) of the households have been able to diversify to other enterprises due to saving time and labour. Some households (12%) have gone further with intensifying livestock production to the extent that they have been able to reduce or stop shifting cultivation (Horne 2005).

These farmers tend to be the earlier adopters or individuals who are able to take greater risks due to sufficient land, livestock and paddy rice. Poorer households may take longer to intensify depending on access to markets, labour and land availability or personal decisions to stick with more traditional farming systems.

Many of the impacts from using forages are significant and affect both individual households and whole villages. As FLSP expanded, the challenge has been to move beyond simply trialling new technologies with farmers on a small scale to enabling significant livelihood impacts across larger numbers of households, villages and districts (a process known as scaling out). The Australian Centre for International Agricultural Research (ACIAR) project *Accelerating the Impacts of Participatory Research and Extension on Shifting Cultivation Farming Systems in Lao PDR* (known as AIRP) was developed to assist with trialling and researching methods for scaling out technologies and their impacts (Millar et al 2003; Connell et al 2004).

The role of the ACIAR project is to research ways to effectively scale out technologies and their impacts using FLSP as a vehicle. Within the three broad objectives of the project, this study relates to the second objective of researching the process of accelerating and spreading the impacts from participatory research and extension (extension process change) as shown in Figure 2.

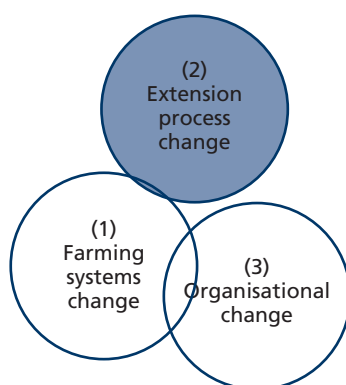


Figure 2. Linkages between the three research areas

Charles Sturt University (CSU) has provided overall project coordination and research input including staff training. Project coordination in Lao PDR is provided by NAFES.

3. Introduction

Poverty alleviation among rural households and villages in upland areas of Southeast Asia remains a major challenge due to their remoteness and reliance on shifting cultivation farming systems. This is particularly so in the northern regions of Lao PDR where more than 85% of the population live in rural households and about 40% are fully or partially involved in shifting cultivation (Hansen 1998). Although poverty in Lao PDR has been considerably reduced along the Mekong River corridor due to market intensification and diversification opportunities, northern upland areas have not benefited from such social and economic development (Sisouphanthong and Taillard 2000).

Upland farming systems vary within and between villages depending on land tenure and access, soil type and fertility, labour availability, forest resources, market access and opportunities, incidence of animal and crop disease, family size and structure, traditional connections with the land and farming skills. Householders traditionally rely on livestock for cash income and as a safety net in times of need such as health, education, weddings, new house, etc. However over the last 40 years there has been an overall trend towards shortened crop rotations with lower crop yields, an increase in weeds and pests with associated labour requirements, increased incidence of livestock diseases, greater loss of forest and wildlife resources and land degradation in some areas (Roder 2001). Within this context, there is increasing recognition that:

- ▶ the problems and opportunities of shifting cultivation systems are complex requiring different research and extension approaches from the lowlands;
- ▶ farmers' capacity to innovate and make changes to these farming systems can be significantly stimulated and facilitated by using decentralised participatory research and extension methodologies; and
- ▶ progress is critically linked to increasing the capacity of research and extension staff and their organisations to conduct participatory approaches that generate learning and change through innovation of methods.

The Lao government has embraced the concept of working with farmers as partners in adaptive research using participatory approaches to solve their own problems (NAFES 2005). The FLSP, like many projects that use participatory research approaches, soon faces the challenge of how to move beyond simply trialling new or 'raw' technologies with individual farmers on a small scale to enabling significant impacts across larger numbers of households, villages and districts (Fujisaka 1999; Horne et al 2000).

This process, commonly referred to as 'scaling out', can be defined as:

the process of working with farmers to enable beneficial technologies to be adapted across a wide range of people and farming systems to improve their livelihoods.

Once farmers are empowered to experiment and innovate, how can research and extension staff facilitate greater integration of technologies within and across farming systems? How do local staff learn to go beyond working with individual farmers to working effectively with farmer groups? How can they stimulate ongoing sharing of local farmer knowledge and experience? How do they use both local and scientific knowledge to help farmers solve immediate and long-term problems? How can significant impacts (both expected and unexpected) be captured and used as extension or learning tools? These were the questions posed by FLSP as the process of scaling up began to evolve.

In a practical sense, the FLSP team in conjunction with the ACIAR project determined that scaling out could occur in three ways:

1. Introduce proven technologies and their potential impacts to new villages.
2. Encourage and enable more farmers within existing FLSP villages to take advantage of the technologies being used by other farmers, adapt them to their own farming systems and benefit from the impacts.
3. Introduce the technology to other development projects (e.g. non-government organisation/ government).

However, before embarking on any of these pathways, FLSP had to be able to clearly demonstrate that potential impacts are real, achievable and substantial. In 2002, FLSP began conducting cross visits (where farmers are taken to another village) as a way of enabling new farmers to see and discuss forage and livestock production with experienced farmers. As more cases of impacts started to emerge and the number of experienced or 'champion' farmers grew, district extension staff started to develop case studies of successful farmers with support from provincial and national research and extension staff from NAFES and NAFRI.

In 2004, FLSP decided to increase the number of villages from 51 to 104 so the provincial and district teams had to decide how they were going to introduce potential impacts to 53 new villages in an effective and efficient way (i.e. scaling out method 1 above). This created an opportunity to trial three known extension methods (case studies, cross visits, champion farmer visits) using participatory action research techniques.

This report describes how the extension methods were applied, how the research was carried out, who was involved and the effectiveness of each method for scaling out to new villages based on individual farmer interviews, individual staff interviews and staff workshops. Implications for further scaling out of forage technologies in Lao PDR, scaling out proven technologies in general and new areas for extension research are discussed.

4. Methods

Action research approach

Action research differs from traditional social research in that research is conducted with the people responsible for implementing the outcomes of the research. Instead of outside ‘experts’ designing and doing the research, those working directly with local people or local communities themselves are involved in the research process. The process is valued as much as the product and success relies on developing skills of participants through an iterative cycle of action and reflection (Kindon 2005).

As Russell and Harshbarger (2003, p. 235) explain,

Sharing thoughts, discussing research questions, asking questions, sparking the imagination and intellect, collaborating, building partnerships, taking action and getting the desired results is what action research is all about.

This research was carried out with staff from the provincial and district agriculture and forestry offices in Luang Prabang and Xieng Khouang over a period from February 2004 to February 2005. It involved several stages including:

1. planning and implementation of extension methods (February to June 2004)
2. selection of villages and farmers for interviews (August 2004)
3. farmer interviews (September 2004)
4. district staff interviews (October 2004)
5. staff reflection workshops (October 2004 and February 2005).

Planning and implementation of extension methods

Discussions were held in March 2004 with provincial staff to plan the research design. The three extension methods selected were based on their relative success to date and staff familiarity with each method:

- **case studies presentations** using photos and sketches
- **cross visits** to one or more villages with significant impacts
- **champion farmer visits** to new villages to talk about his/her impacts.

Provincial staff then made work plans with the district staff to select new villages for trialling each method, as shown in Table 1:

Table 1. Number of villages involved in each extension method

	Xieng Ngeun	Luang Prabang	Pak Ou	Pek	Nonghet	Total
Case studies	4	7	3	10	14	38
Cross visits	3	3	2	—	—	8
Champion farmer visits	2	—	2	3	—	7
Total (district)	9	10	7	13	14	53
Total (% of FLSP villages in province)	26 (45%) Luang Prabang			27 (55%) Xieng Khouang		100%

The case study method was more widely applied for the following reasons:

1. relative ease and lower costs in organising a village meeting to show case studies; and

2. farmers in Xieng Khouang were busy in the fields in May and unavailable to attend or host cross visits which takes a full day compared to a case study meeting which takes a morning or afternoon.

However, for the purposes of getting a direct comparison of the three extension methods, there were enough villages in each category to select for interviews in the limited time available for conducting interviews (one month). The accumulated experience of district staff in working with these extension methods would also be taken into account using staff interviews and workshops.

Developing and testing case studies

During April, national staff worked with provincial and district staff to develop a range of case studies that would demonstrate potential impacts from different livestock systems across all five districts. From 4–8 April 2004, Viengxay Photakoun met with District Agriculture and Forestry Extension Office (DAFEO) and Provincial Agriculture and Forestry Extension Centre (PAFEC) staff in Luang Prabang to provide training in identification and documentation of case studies of impacts. Provincial staff from Luang Prabang then repeated this training in Xieng Khouang in the following week. The resulting processes and cases were evaluated by Viengxay and John Connell from 19–21 April 2004 and feedback provided to all the district staff. Viengxay then attended the monthly meeting of district staff in Luang Prabang to evaluate the progress they had made with the case studies.

Nine case studies were developed: two on pig raising systems, two on buffalo fattening, two on cattle feeding and management, and three on goat systems. A workshop was held for all Xieng Khouang district staff from 5–9 May 2004 in Nonghet, conducted by Viengxay, John Connell (CIAT), Bouathong Keola (AIRP) and Ounkeo Pathammavong of Smallholder Agroenterprise Development in the Uplands (SADU). During this training, the district staff were split into three teams to present cases of impacts to two new villages on (i) raising large animals, (ii) raising goats and (iii) raising pigs. This process was repeated for all district staff in Luang Prabang from 10–17 May 2004, with case studies being presented to farmers in three new villages. Each district team was given the same set of case studies which they presented to new villages as photos with verbal explanation of what the farmers in each case study were doing to improve livestock production.

In the process of presenting case studies, it became evident that farmers were not getting enough information from the photos and explanations alone so Viengxay began drawing system sketches to illustrate the steps taken by case study farmers. This method stimulated more discussion and understanding amongst farmers in the new villages, and was continued for the rest of the case study villages. Staff reflected in between village visits on what had worked and not worked in their case study presentations. These reflections enabled them to improve on their case study presentations as they moved from village to village (known as ‘Ban’ in Lao language). Using system sketches worked particularly well in Xieng Khouang province where many Hmong farmers understood less of the Lao language, especially the women who generally spoke Hmong only.

Cross visits

Cross visits were organised for eight villages in Luang Prabang province (timing did not suit Xieng Khouang villages which were busy preparing fields). Xieng Ngeun district team selected Ban Sip Et, Ban Phonsavan and Ban Sen Oudon to visit Ban Houy Hia and Ban Phonsaad. Pak Ou district team organised for Ban Had Kham and Ban Lisevilay to visit Ban Had Pang and Ban Somsanuk. Luang Prabang district team took Ban Phongam, Ban Kok Ngieu and Ban Meungkai

to visit Ban Houay Hia and Ban Phonsaad. The selection of these villages was aimed at closely matching existing or potential farming systems so farmers could learn about how to improve livestock production using forages. Representatives who attended the cross visits from new villages then gave a feedback session to the rest of their village on the next day.

Champion farmer visits

A visit by two champion farmers from Ban Houay Hia was organised for Ban Phou Khoua in Xieng Ngeun district due to its proximity to Ban Houay Hia, and their interest in cattle and goat raising. In contrast, Pek district staff organised for a champion farmer from Ban Xang who fattens buffalo to visit Ban Phonetong to inspire farmers who had potential to fatten large animals.

Selection of villages and farmers for interviews

Nine villages (15% of total villages involved) were randomly selected for farmer interviews, comprising three villages for each method across different districts (six villages in Luang Prabang province and three villages in Xieng Khouang province).

For each village, district staff in conjunction with the village headman or group leader were asked to select three farmers who had planted forages that year (active) and three farmers who had not planted forages (non-active). All farmers were to have been present at the case study meeting, cross visit or village feedback, or champion farmer visit meeting. Table 2 summarises the final number of villages and farmers selected.

Table 2. Number of villages and farmers selected for interviews

	No. of villages	Active farmers	Non-active farmers	Total farmers
Case studies	3	9	8*	17
Cross visits	3	9	9	18
Champion farmer visits	3	9	9	18
Total	9	27	26	53

* Note: one non-active farmer did not turn up on the day.

Farmer interviews

Semi-structured interviews with individual farmers were carried out to explore how effective each method had been in terms of:

- ▶ creating initial awareness of potential benefits and impacts from using forages;
- ▶ how many farmers were trialling forages and which system they adopted;
- ▶ what benefits or problems they were already experiencing;
- ▶ their plans for future use or expansion;
- ▶ what they thought of each extension method as a learning tool; and
- ▶ their preferences for learning.

These possible indicators of effectiveness were then grouped according to the following progressive stages of farmer learning and technology adaptation.

Awareness

- ▶ Level of farmer awareness of potential impacts using a scale of 1–5 (active and non-active)

Trialling and impacts

- ▶ Number of active farmers (i.e. percentage uptake)
- ▶ Area and type of forage planted (active only)
- ▶ Adoption of systems and problem-solving ability (active only)
- ▶ Farmer observations and impacts to date (active only)
- ▶ Reasons for not using forages this year (non-active only)

Plans

- ▶ Intention to plant forages next year (active and non-active)
- ▶ Plans for livestock systems (active and non-active)

Preference for learning

- ▶ Farmer preference for learning methods (active and non-active)

Interviews were carried out over a two-week period in September 2004. There were two teams each comprising one NAFES or PAFEC staff member, one Charles Sturt University researcher and the two district extension workers responsible for that village. Each team did three interviews per day (two before lunch, one after lunch). A field inspection was held on completion of the interviews to look at forage plots and livestock raising methods.

On arrival in the village, the district staff introduced the research team to the village headman who then gave a welcome speech and introduced the farmers selected for interview. The teams then split up to conduct the interviews either in the farmer's house or headman's house. Lunch was brought by the research team and shared with all farmers involved on the day. The following interview guide was used:

Questions for active farmers

1. What interested you when you attended the (case study meeting, cross visit, meeting with champion farmer)?
 - ▶ Probe for which technologies interested them and why.
 - ▶ Probe for impacts that impressed them and why (production/livelihood impacts).
 - ▶ Probe for which farmer innovations interested them and why.
2. What did you decide to trial and why (type of forage, area)?
3. What are you doing now (e.g. number of livestock, feeding method, marketing, problems)?
4. What will you do next year? In 5 years?
5. Which extension methods do you prefer?
6. What do you think is the most effective way for farmers to learn about new technologies?

Questions for non-active farmers

1. What are you doing now (number/type of livestock, feeding, markets, problems)?
2. What did you see and hear at the meeting/cross visit?
3. Was it relevant to you? Why/Why not?
4. Why did you decide not to plant forages this year?
5. What will you do next year? In 5 years?
6. Which extension methods do you prefer?

Appendix 1 summarises the location and size of each village visited in the study, reliance on major livestock types (small and/or large), number of active/non-active farmers (total and percentage interviewed), attendance at each method and forage area planted in 2004.

Village size and livestock enterprises

The number of households in the selected villages varied widely from 29 households to 134 households which is typical of upland villages in northern Lao PDR. This variation is due to diversity in remoteness and market access (e.g. Ban Pa Hok/Na Lum); relocation and joining of villages/ethnic groups (e.g. Thinkeo/Sip Et, Had Kang) and the influence of aid projects (e.g. Had Kham/Had Kang).

The type of livestock production in each village is closely related to remoteness and ethnicity. For example, Ban Thinkeo in Xieng Ngeun district is a relocated village with allocated land so there is very little land available for grazing large animals. The village has good access to markets in Xieng Nguen and Luang Prabang where there is a high demand for goats, pigs and poultry (small livestock production). In contrast, Ban Pa Hok, which is more remote, has a traditional association with cattle raising (Hmong ethnic group) with extensive areas for grazing and trader demand for cattle and buffalo for the Vietnamese market.

Attendance at meetings or cross visit

Attendance at the meetings or cross visit was slightly higher amongst active farmers interviewed than non-active farmers interviewed. This was due to the difficulty in finding non-active farmers to interview at short notice. The district staff know the active farmers so could nominate them beforehand, however they had to rely on the village head to select non-active farmers who had attended the events. When the time came, some of these farmers had already gone to the field or into town so their spouses or children were interviewed instead even if they had not attended the events.

Staff interviews

Semi-structured interviews were conducted with individual district staff in October 2004 after completion of the farmer interviews. Fourteen district staff were interviewed from Luang Prabang province only. Time did not permit interviews with Xieng Khouang staff, however these staff were involved in workshops in October 2004 and February 2005 where the effectiveness of each extension method was discussed.

Staff workshops

A mid-season workshop was held with all district and provincial staff in October 2004 at Phonsavan, Xieng Khouang. A reflective session was held on the fourth day to discuss staff experiences with trialling the extension methods with new villages and their views on method effectiveness. Viengxay presented a summary of what each district team had implemented during 2004 by asking each district which method they used as a way of getting them back in touch with what happened. Each method was explained also to remind staff. This process enabled each province to understand what the other province had done also.

This process was repeated in a more formal way at a pre-season workshop in February 2005 at Luang Prabang to review activities and plan for the coming wet season.

5. Findings

Level of farmer awareness about forages and potential impacts

The level of farmer awareness about potential impacts from using forages was determined from individual responses to:

- ▶ Question 1 for active farmers (i.e. What interested you when you attended the (case study meeting, cross visit, meeting with champion farmer?); and
- ▶ Question 2 for non-active farmers (i.e. What did you see and hear at the meeting/cross visit?).

Responses were analysed and given an overall rating of 1 to 5 (1 = no awareness, 2 = some awareness, 3 = aware, 4 = very aware, 5 = strongly aware). Awareness amongst cross visit farmers ranged from 1 to 5, case study farmers ranged from 1 to 4 and champion farmer visit farmers ranged from 1 to 3. Scores were then averaged for each method as shown in Figure 3.

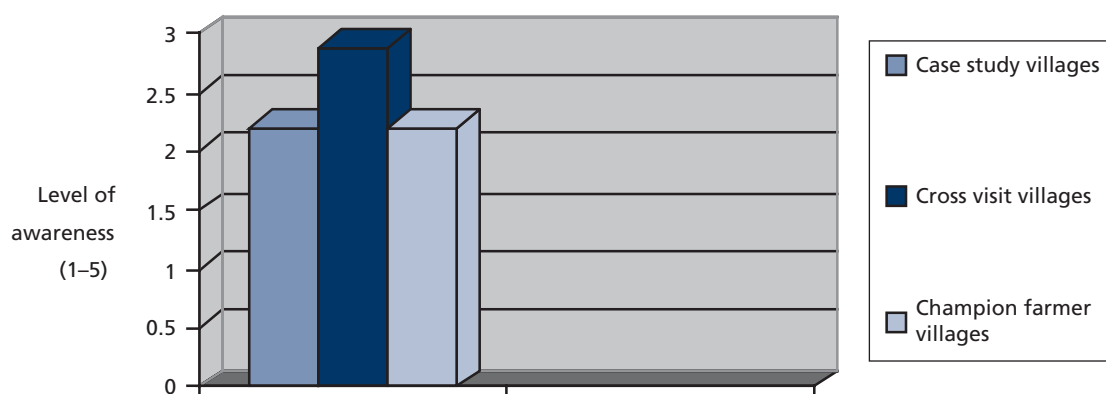


Figure 3. Average level of farmer awareness of potential impacts

These results show a higher level of awareness amongst those farmers who attended the cross visit and village feedback sessions. Farmers who attended the cross visit were able to describe what they had seen (e.g. forages grown, livestock systems), what the host farmers had told them (benefits and impacts) and how to establish and use the forages. Importantly, they were also clear about what they did not like and how they would do things differently. For example, an active farmer from Ban Sip Et, in Xieng Ngeun district was very clear about the impacts he had seen on a cross visit including:

- ▶ having lots of feed for livestock;
- ▶ reduction in labour required to collect local feed;
- ▶ increase in pig liveweight of 15 kg/month.

After inspecting forage plots and talking to host farmers, he decided he wanted to use stylo and guinea grass for pig and goat raising. He said he was not interested in gamba grass because it appeared to be too 'stemmy and hairy'. He was critical of some methods used by the host farmers including:

- ▶ pig pens were not raised;
- ▶ more labour required if buffalo, cattle and goats are tethered;
- ▶ feeding forages on the ground is not good (wastage) — better to put in a feed trough.

Even among non-active farmers who did not attend the cross visit but attended the village feedback meeting (i.e. where farmers who had been on the cross visit reported back to the village), the level of awareness was higher than non-active farmers who attended a case study meeting or champion farmer visit. For example, a woman farmer from Ban Had Kham, Pak Ou, said the village head reported back about a farmer who planted forages to feed goats which grew well and the farmer saved time and labour. She recalled that he also spoke about pig raising and how they grew well, sold for a good price and saved labour. She also learnt that forages are easy to feed and do not need cooking. After listening to the headman talking, she believed that the impacts were true and wanted to grow feed for buffalo and pigs.

There was less difference in the level of awareness amongst farmers who had attended case study meetings and champion farmer visits. The lower level of awareness from using these methods can be attributed to lack of 'seeing is believing', less opportunity and time to ask pertinent questions and too many people at the meetings. As one case study meeting attendee said:

The photos were small, only those sitting closer could see. There were not enough words on the posters to understand and explain new methods. There were too many people at the meeting, so it was too noisy.

Amongst non-active farmers there was a slightly higher level of awareness for those who had attended a champion farmer meeting than those attending case study presentations, whereas for active farmers the level of awareness was similar for both methods. Many factors can contribute to awareness level particularly when interviewing 2–3 months after the event. The active farmers had the advantage of already growing and using forages and seeing the immediate benefits. Some non-active farmers were observing active farmers and wanted to wait and see before committing themselves. Despite these confounding factors, most farmers were able to describe what they learnt from the meetings, whether case study presentations or a champion farmer talking, and explain why they decided to try or not try forages.

Number of active farmers

The number of farmers in each village who decided to trial forages after attending one of the three extension activities varied from 5 to 20, with an average of 11 active farmers or households (hh) per village (Table 3).

Table 3. Number of active farmers

	Case studies	Cross visits	Champion farmer visits
No. of active farmers/ village	Thinkeo 10 Na Lum 11 Pa Hok 15	Phongam 5 Sip Et 10 Had Kham 11	Phoukoua 6 Phongtong 20 Had Kang 14
Total active	36	26	40
% of total households	18%	14%	23%

The higher proportion of active farmers appeared to be in villages with greater land availability (e.g. Pa Hok, Phontong). However during the interviews it became evident that many other factors also contribute to farmer interest and willingness or capacity to trial forages (e.g. prior experience or awareness, attendance on the day, level of understanding, land, labour and seed availability, village regulations). These factors are discussed further in the section on reasons for not using forages.

The lower proportion of active farmers in villages for cross visits may be due to the small number of farmers able to go on a cross visit, and the quality of their feedback to the village. However these villages are also in areas where land has been allocated, therefore less land is available for growing forages and farmers are more likely to wait and see a result before substituting forages for cash crops.

In contrast, Phontong village which had the highest number of active farmers (20) had a big turnout to the visit by champion farmer, Mr Lao Lee from Ban Xang. Many farmers were impressed by his talk and the range of case studies presented. As a result, the head of the village made a regulation that all farmers must grow forages if they want to raise livestock, and each family is required to grow no less than 400 sq m. Hence the number of farmers electing to trial forages is a function of both environmental and social circumstances of which the extension method used is but one factor.

Area and type of forage planted

The range and total area of forage planted by active farmers for each extension method used is shown in Table 4.

Table 4. Forage area planted

	Case studies	Cross visits	Champion farmer visits
All active farmers from 9 villages (102)	1.5 ha	1.2 ha	1.8 ha
Active farmers interviewed (27)	0.95 ha Range (0.02 to 0.5 ha)	0.33 ha Range (0.01 to 0.1 ha)	0.99 ha Range (0.06 to 0.25 ha)

Forage area planted is directly related to land availability and the type of livestock raised rather than the extension method used. Forage area is higher across those villages raising large animals as larger plots are required to maintain or fatten cattle and buffalo. Amongst the farmers interviewed the trend was the same, with large animal farmers planting areas up to 1500 sq m (one farmer planted 0.5 ha), whereas most small livestock owners planted 300 to 600 sq m. In some districts, a minimum plot size was stipulated by district staff (generally 400 sq m to allow cuttings for expansion) which also influenced total forage area compared to other districts where the farmer chose minimum plot size.

There was no difference with type of forage planted between villages involved in each extension method. Farmers planted different forage varieties and combinations of grasses, stylo and sweet potato depending on their livestock system and growing conditions.

Adoption of systems and problem-solving ability

In the process of scaling out proven technologies, possible indicators of success are whether farmers are clear on how to integrate the technology into their farming system and whether they are able to overcome technical problems as they arise, rather than relying on outside expertise. Innovation with the technology may also be an indicator.

Table 5 shows the range of livestock and forage systems used by active farmers interviewed according to each extension method. As it was their first year of growing forages, most farmers were using forage varieties as supplements only within existing systems, and had not adopted totally new enterprises.

Table 5. Adoption of systems

	Case studies	Cross visits	Champion farmer visits
Systems used (in order of relative importance to those villages)	Pig fattening in pens (stylo/rice bran mix) Drying stylo Chicken, pig and turkey raising Cattle and buffalo supplement	Pig fattening (stylo/rice bran mix) Goat raising Fish feeding* Cattle supplement Chicken and duck supplement *Farmer innovation — tying bunches of forages to wire across the fishpond	Cattle and buffalo supplement Chicken and duck supplement Pig fattening Goat raising

The livestock and feeding systems adopted related to existing village enterprises and access to markets as well as individual farmer preferences (e.g. women tend to raise small livestock). However in some cases, farmers were inspired to expand livestock numbers as a result of seeing successful enterprises on cross visits or hearing about them from champion farmer visits (e.g. goat raising).

During the interviews it became evident that there was a higher incidence of technical errors and lower ability to solve problems amongst farmers who attended the case study meetings compared with farmers who attended cross visits. One farmer was feeding the wrong ratio of stylo and rice bran to his pigs; another farmer was not cutting stylo before mixing with rice bran and a couple of farmers had not cut their forages because they were waiting for the district extension staff to tell them when to cut. This also occurred with one farmer who had attended a champion farmer talk.

Reasons for this can be explained from comments made by some farmers who attended case study meetings who indicated that there was not much time spent discussing technical issues (e.g. how to plant and use forages, potential problems). Farmers indicated that the presence of champion farmers at cross visits allowed more in-depth discussion and demonstration of the technical aspects of forage and livestock production. This was supported by interviews with some district staff who found that less assistance was needed by farmers who attended the cross visit or champion farmer visit, compared with case study villages.

Farmers may not adopt exactly the same system as the ‘champion farmers’. Instead, as with the majority of active farmers interviewed in this study, farmers may use trial and error to make the technology work for them within their existing livestock or farming system. For example, an active goat and cattle farmer from Ban Phongam, in Luang Prabang district, attended a cross visit to Huoay Hia and Phonsaad in Xieng Ngeun district. He saw farmers raising goats in pens in Houay Hia, and decided to plant 0.1 ha of forages and buy six more goats when he got home. He tried grazing the goats in the forage area and found that they only ate the tops of the forages so the plot became unevenly grazed. When he feeds in the pen the goats eat everything so now he combines cut and carry with free grazing. He plans to double the area of forages and buy 10 more goats to raise as prices are good now for goats.

Alternatively some farmers may decide to ‘copy’ systems in the first year, particularly if they don’t already have livestock or they decide to change livestock type. A woman farmer from Ban Sip Et in Xieng Ngeun district decided to buy pigs for the first time after she attended a cross visit village feedback where she learnt about growing stylo for pigs. Her traditional enterprises are paddy rice,

upland crops, vegetables, fruit trees and poultry. She established a plot of stylo and sweet potato in June 2004 (20 × 20 m) then bought one boar and six piglets. The pigs are fed three times a day on a ration of 2 parts rice bran to 0.5 parts stylo morning and night, with fresh sweet potato at noon. She is also drying stylo for later use and plans to raise 10 pigs at a time.

There may be more risk in farmers adopting new enterprises or expanding too quickly if the farmer does not have adequate experience or knowledge already or the level of advice and support has not been adequate. Although this was not evident at the time amongst the farmers interviewed, there are examples within FLSP where this has occurred leading to farmer disillusion with the technology and perceived failure. This is being investigated in another study by AIRP (Sarah Whittaker).

There was only one example of farmer innovation. A farmer from Ban Phongam had been on a cross visit but there were no examples of forages being fed to fish. He decided to plant forages on the bank of his fishponds and observed wastage when he threw forages into the fishpond. He tried tying bunches of sweet potato and stylo to a length of wire across his fish pond and noticed the fish ate all the bunches. It is unusual to see evidence of farmers experimenting and innovating in the first few months of trialling a new technology as they are gaining confidence and working out how to use the forages effectively. Further innovation can be expected as farmers gain more confidence through observations and trial and error.

Farmer observations and impacts to date

The following list summarises farmer observations which were common across villages regardless of extension method used.

- ▶ Pigs/fish are fatter/increase in weight gain
- ▶ Pigs have shorter hair, skin colour change
- ▶ Manure looks richer (will use in garden and paddy)
- ▶ Cattle and buffalo come to the village now and pigs stay in the village
- ▶ Livestock like eating the forages (some take time to get used to new varieties)
- ▶ Pigs seem to prefer sweet potato to stylo

The following list summarises both livelihood and production impacts resulting from forage use as mentioned by farmers:

Livelihood impacts

- ▶ Labour saving of 1–5 hours/day
- ▶ Time for other activities now
- ▶ No need to cook pig feed
- ▶ Less firewood needed
- ▶ Children can cut and carry (easy)

Production/income impacts

- ▶ Saves cost of buying rice bran (forages are free)
- ▶ Can feed sick animals now (less worried)
- ▶ Enough feed in the dry season

- ▶ Pig weight gain of 10 kg in 2 months
- ▶ Good price for fish (rapid weight gain on forages)

The interesting aspect of this study is that both production and livelihood impacts were being achieved as early as 3–4 months after planting forages, compared to earlier FLSP villages that took longer to achieve impacts as forages were grown on a smaller scale without the knowledge of how to use them or integrate them into farming systems. This acceleration of impacts is a major indicator of effective scaling out in the short term, however impacts need to continue into the long term for the technology to be sustainable.

Reasons for not using forages this year

The reasons given by non-active farmers for not planting forages this year are shown in Table 6.

Table 6. Reasons for not using forages in 2004 (N=23)

Summary of reasons given	No. of mentions
Would like to see impacts first	5
Not enough labour	4
Not enough time (doing other activities at planting time)	4
Tried but not successful	3
Not enough land	2
Seed came too late or not available	2
Need more information	2
Already sown land to another crop	1
Land is too far from house	1
Not enough money to buy livestock	1
Sick at the time of planting	1
Enough feed already for livestock (Hmong)	1
Need to build a fence (Hmong)	1
Able to use a forage plot left by farmer who moved to another village	1

The most common reason mentioned was that farmers wanted to see impacts occurring in their own village first, before trying it themselves. In fact, one village (Phongnam) decided at the cross visit village feedback meeting to nominate the five farmers who went on the cross visit as ‘guinea pigs’ to trial forages and other households could then assess whether to participate in 2005.

The notion of ‘try before buy’ has implications for extension and scaling out. It may be better to allow a small number of success stories to establish in a village first so that other farmers can see forages firsthand and call upon the experienced farmers to assist with establishment and use. If many farmers participate in the first year and there is not enough support from district officers or farmers outside the village, failures will be inevitable.

The issue of labour and time availability to establish forages could be an important constraint to overcome (i.e. the need to spend time now to save time later). If district staff are aware of these constraints they can assist households to plan in advance to work around other activities and find labour. However farmers have to know that forages will save them time in the future (if they are already collecting local feed) otherwise they will see forages as an extra burden. If they are starting livestock production for the first time, there will be a period when labour is needed for both forages and cropping, however this should decrease over time if income from livestock allows farmers to reduce upland cropping or cash crops.

Shortage of land is a difficult constraint to overcome, particularly if land has already been allocated in the village. Alternatives could be buying forages in cash or in kind from another farmer, borrowing forages and paying back, leasing land or growing forages amongst or around the edge of crops. Likewise loans for livestock may be needed to allow some farmers to participate. If farmers have land for forages but did not want to keep livestock they could sell forages and cuttings.

Several non-active farmers had actually tried or wanted to establish forages but the seed did not arrive in time or they had establishment failures. These are constraints more easily overcome by district staff. When asked, most of the non-active farmers said they intended to use forages in 2005, indicating that constraints in most cases are temporary.

Although there was only one comment from a Hmong farmer about having enough livestock feed already due to access to large grazing areas, this may influence attempts to scale out forage technology to more remote villages. Hmong farmers traditionally graze their cattle and buffalo in areas far from the village so intensive management may be less attractive to them.

Future plans for forages and livestock systems

Of the 53 farmers interviewed, all but three said they would expand existing plots or plant in 2005 demonstrating a high level of confidence in the technology regardless of the extension method used. Table 7 shows the forage area to be planted in 2005 based on farmer predictions. The area to be established varied according to land availability and livestock systems in each village (i.e. larger areas for cattle and buffalo) rather than extension method used. Active farmers will plant a total of 6 ha whereas non-active farmers will plant 3 ha indicating a greater level of confidence with active farmers and an ability to expand using cuttings. However it must be kept in mind that farmer's plans may not eventuate or may in fact be different from these estimations.

Table 7. Forage area to be planted in 2005 (hectares)

	Case studies	Cross visits	Champion farmer visits	Total
Active farmers	3.00	0.82	2.30	6.12
Non-active farmers	0.65	0.20	1.56	2.41
Total	3.65	1.02	3.86	8.53

Farmers' plans for their livestock systems were similar across all three extension methods indicating all methods were successful in motivating farmers to make short- and long-term plans (Table 8).

Table 8. Farmer plans for livestock systems

	Case studies	Cross visits	Champion farmer visits
Active farmers	Breed and fatten pigs Increase no. of pigs and sell earlier Raise turkeys Cattle fattening	Increase no. of pigs, supplement cattle Goat raising Chickens and ducks supplement Crossbreeding chickens Buffalo fattening	Increase all livestock Cattle and buffalo fattening Goat raising Fatten pigs
Non-active farmers	Increase no. of pigs Grow stylo for turkeys and pigs Grow grasses for buffalo Expand numbers of cattle: 2 cows/year	Pig supplement Buffalo and cattle supplement	Increase number of pigs, goats and chickens Cattle and buffalo supplement

Any differences were mainly due to existing village enterprises and market opportunities. The important issue here is that farmers plan ahead according to their level of comfort and experience with livestock systems, market prices being offered by traders and relative profitability to other produce, land and labour available, their need for income and their stage in life.

For example, some farmers decided they would develop cattle and buffalo fattening enterprises or goat raising as shown in case studies and/or presented by champion farmers at cross visits or meetings. An active livestock and crop farmer from Ban Phongtong in Pek district attended a meeting addressed by buffalo fattener, Mr Lao Lee from Ban Xang. He then worked out that he would make 7.5 times more profit from growing forages on 0.1 ha of land and fattening cattle and buffalo compared to growing vegetables on the same area (i.e. profit of 1.2 million kip.). His plans are to expand forage area to 1000 sq m and buy 1 thin cow and 1 thin buffalo at a time to fatten.

Farmer preference for learning

Towards the end of each interview, farmers were asked which extension method they preferred for learning about new technologies. The results are shown in Figure 4 for all farmers interviewed. (Note: no-one nominated case studies as a preferred method.)

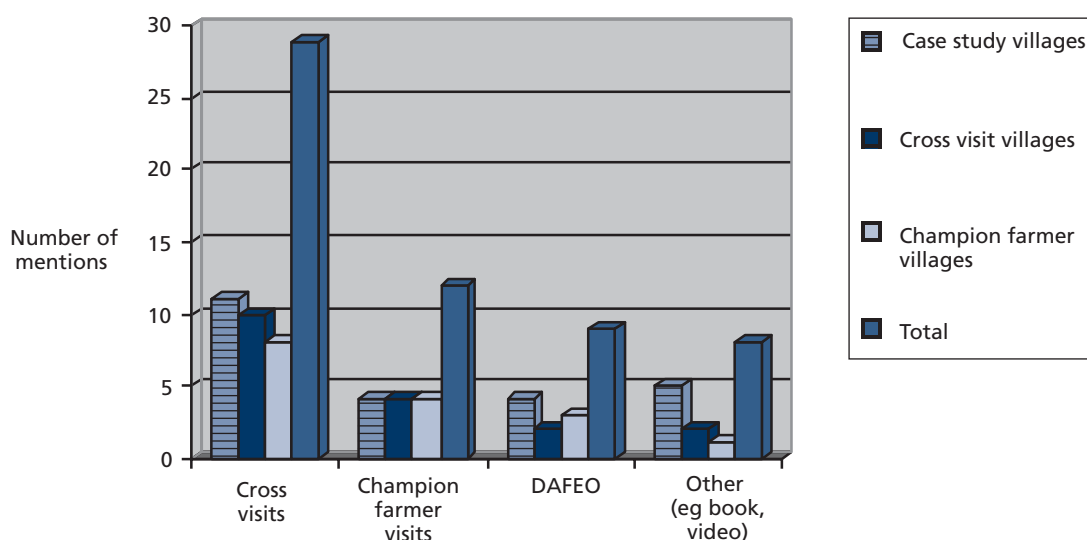


Figure 4. Farmer preference for learning

Cross visits

There is a strong preference for cross visits as a method for learning about new technologies, even amongst farmers who have never been on a cross visit. Reasons given related to being able to see a range of forage plots and livestock management and talk to host farmers. The following quotes from farmers illustrate these points.

A non-active farmer, Ban Pa Hok, Nonghet (case study village):

I need to look at impacts in another village first, then I might plant. I need to know the planting system, cutting method and explanation of how to fatten animals.

An active farmer, Ban NaLam, Pek district (case study village):

If a champion farmer comes to visit then it's difficult for me to remember what he/she has said. However if I go on a cross visit and see for myself then I am more likely to remember.

Active farmer, Ban Sip Et, Xieng Ngeun (cross visit village):

A cross visit is better than a field day because the farmer is talking, not just staff from the district and provincial services.

Several farmers suggested that they would prefer to go on cross visits with a small group from their own village rather than several groups from other villages to allow more discussion as they felt there were too many people at each location. Interestingly, active farmers were twice as likely to mention cross visits as their preferred method than non-active farmers. This may indicate different learning styles between active and non-active farmers.

Champion farmer visits

Champion farmer visits were the next most popular extension method. Those farmers who preferred a champion farmer to visit their village gave reasons such as:

- ▶ lack of time (women)
- ▶ too far to travel (e.g. remote village, older farmers)
- ▶ concerns about leaving children and house security (women)
- ▶ more chance of being able to discuss things one to one and in detail (e.g. step-by-step)
- ▶ high credibility of champion farmer.

As one farmer from Ban Phontong expressed:

I believe Mr Lao Lee because he is a farmer and has done these things by himself.

Some farmers expressed the desire to hear from champion farmers in their own village in preference to other villages. For example, another farmer from Ban Phontong said he would not like champion farmers from a distant village because the climate is different. He prefers to hear about local successes, and for champion farmers to explain how to do things better, such as getting better yields.

DAFEO visits and other methods

Those farmers who had attended case study meetings only, were more likely to want technical information and more follow-up advice on what to do (e.g. DAFEO visit, books, video, demonstrations). Nine farmers said they would prefer to work with district staff on a one-to-one basis. For example, a female farmer from Ban Had Kham in Pak Ou district said she needed to have the district officer explain to her how to prepare, plan, sow and take cuttings, how to feed animals and how to control weeds and pests.

One farmer suggested that DAFEO could work with a group to demonstrate what to do and then farmers could do it by themselves. A few farmers said they wanted more technical information in the form of books, videos and demonstrations. One farmer said he would prefer to visit other farmers by himself.

Case studies

Many farmers thought that case studies alone did not provide enough information, and some did not fully understand what was being presented. A farmer from Ban Phongam, Luang Prabang district, gave these comments:

The photos were not clear, black and white, and small. They need to be colour and bigger with words. They need detail of type of grasses, name of farmer, location, ethnic group, method for planting, harvesting, feeding, etc. For example, why do Hmong people do really well at livestock production? I would like to compare.

A few farmers thought the case study presentations were good on the whole but felt that a cross visit or champion farmer visit was needed so they could talk with other farmers. As one farmer from Thinko village said:

It was good to see so many systems but I'd like to meet with a champion farmer in the field. I would like to ask a champion farmer to visit me and explain how to raise pigs.

Multiple methods

In the process of expressing their preference for different extension methods, some farmers offered suggestions for using multiple methods, indicating they did not see the methods as mutually exclusive. For example, an older farmer from Ban Na Lum, Pek district, said he would like to:

1. discuss issues with other farmers in the village
2. talk with district staff if he has problems
3. exchange information with a distant family and for them to come to his village
4. see different areas and methods.

Likewise, a younger farmer from Ban Had Kang in Pak Ou district said he prefers to visit another farmer by himself because in a group he cannot hear with many people talking. He likes to learn technical things from district officers then visit another farmer to get practical information.

District and provincial extension staff experiences

During individual interviews with staff from Luang Prabang province in early October 2004, staff were asked which method *they* thought was the most effective for introducing potential impacts to new villages. All 14 staff interviewed stated that cross visits were the preferred method largely because farmers can see the plots and animals. However they qualified their statements by saying that conducting cross visits relies on having appropriate impacts to demonstrate, selecting the right farmers and on the remoteness of villages (i.e. often too difficult to organise).

When individual district staff were asked what type of cross visit they thought *farmers* preferred (within district, outside district or outside province), most staff thought farmers preferred to see villages and farming systems outside their own district as they were already familiar with nearby villages. However, one staff member said that cross visits within a district are better for *new* villages to gain confidence that the technologies can work locally, but for villages that are more advanced, cross visits outside the district can be more rewarding to learn new management practices.

Two weeks later at a mid-season workshop in Xieng Khouang, district staff from both provinces gave their comments on the effectiveness of each extension method for new villages in 2004 based on their experiences and observations. While some staff acknowledged that cross visits had been effective in stimulating farmer adoption and independence, others gave accounts of effective farmer adoption from case study presentations and champion farmer visits.

A provincial officer from Xieng Khouang made the point that two successful villages, Ban Ta and Ban Xang, did not attend cross visits in their first year but still achieved impacts. He commented

Table 9. Advantages and disadvantages of various extension methods

Extension method	Advantages	Disadvantages
Cross visits	<ul style="list-style-type: none"> ▶ Farmers can see the real situation ▶ Farmers can talk directly with each other. They can share experiences and lessons directly ▶ Farmers can remember the activities much better when they have seen them in the field (for a long time) ▶ Many farmers get benefits ▶ Farmers get more confidence and it's easy for staff to monitor ▶ Farmers can more easily apply what they have seen back in their own village 	<ul style="list-style-type: none"> ▶ Not many farmers can go on cross visits ▶ Village representatives are mostly selected by the village committee ▶ Transfer of knowledge to other farmers in the village is not so good ▶ Farmers can see only a few examples/ technologies ▶ Uses a lot of time and budget per participating farmer ▶ Risk of travelling ▶ Opportunity for women to go is limited ▶ Farmers who didn't go on the cross visit didn't do very well subsequently
Case studies	<ul style="list-style-type: none"> ▶ Farmers can see many different options and impacts from posters ▶ Saves time ▶ Easier for district staff to organise ▶ Especially useful for villages that are far away ▶ Many farmers in the village can get the information ▶ Farmers can directly select the technology that is most suitable 	<ul style="list-style-type: none"> ▶ Farmers cannot see the real situation ▶ Farmers didn't have enough time to discuss details ▶ Farmers cannot learn much of the practical details ▶ Content of case studies is limited ▶ Not many families get benefits from this approach ▶ Uses more staff as we need to do this activity together ▶ Uses a lot of time to introduce the process and when farmers start working (because they need more help) ▶ Staff find it difficult to explain in detail case studies from other districts ▶ This method doesn't build confidence with farmers
Champion farmers	<ul style="list-style-type: none"> ▶ The champion farmers can explain the example very well because they did the work ▶ Farmers trust champion farmers ▶ More potential for farmers to discuss the example face to face ▶ Better communication (not formal) between farmers ▶ They can share and make plans for future visits ▶ Champion farmers can help the staff to do their job and it doesn't require a lot of budget ▶ Some farmers can easily change their livestock systems from what they have heard ▶ Builds confidence among farmers to hear directly from other farmers 	<ul style="list-style-type: none"> ▶ Farmers don't find out about many impacts from this method ▶ Champion farmers had no pictures to show ▶ Farmers didn't see the activity in other villages for themselves ▶ Sometimes it is difficult to arrange the travel of the champion farmers ▶ Champion farmers can only talk about their own work and experiences ▶ Sometimes the champion farmers are not confident to talk about their experiences ▶ Sometimes the champion farmers do not explain everything they did ▶ Not many options are presented to the new farmers ▶ It is sometimes difficult to arrange the travel of the champion farmers ▶ Uses a lot of the champion farmers' time

that farmer adoption depends on family circumstances and production systems as to how they respond, regardless of extension methods. This was backed up by comments from a district officer from Pek district who said:

Regardless of the extension method, some villages have the capability to do the work to get established and some don't (e.g. availability of labour). We need to be careful in selecting farmers and villages.

Another district officer from Pek district gave another example where village context and prior experience with projects can determine the outcome:

When the champion farmer visited, lots of people attended because they thought it was a project coming but interest flagged when they realised it was not a new project.

After some discussion there was general agreement that all three extension methods can be used at different stages to introduce impacts to new villages, and this may vary from village to village. Likewise, the extension methods used with established villages may also vary according to seasonal access, group size, level of farmer awareness and skill within the group.

Six months later at a pre-season workshop in February 2005, staff were asked to summarise the strengths and weaknesses of the three methods. The aim of this exercise was for staff to start thinking about the extension methods they would use in 2005. The following table summarises how staff identified the advantages and disadvantages of each method.

6. Discussion

This study has shown that three aspects of farmer learning can be influenced by using different extension methods for introducing potential impacts to new villages:

1. farmer awareness of potential impacts
2. farmer confidence in trialling the forages and adapting livestock systems
3. farmer preference for learning.

Attention to these aspects of the farmer learning process are very important for successful scaling out of technologies in terms of the number of farmers participating and likelihood that these farmers will benefit in the short and long term.

The type of extension method used did not influence the number of active farmers, forage area planted, type of livestock systems, farmer observations, impacts from using the technologies, reasons for not using forages or plans for the future.

Cross visits: seeing is believing and understanding

Cross visits had the greatest impact on farmer awareness, farmer confidence and problem solving, and was the preferred method for farmer learning about new technologies. As farmers expressed themselves, cross visits allow them to see the technology at work, question host farmers, exchange experiences and learn the practical aspects of how to use the technology.

Some farmers indicated they would prefer small groups on cross visits to enable more in-depth discussion. Others went further to express a desire to have representatives from their own village only so they could maximise information exchange amongst their own group on return. Herein lies a possible limitation of cross visits in that they create awareness and knowledge with only a small group of farmers compared to events involving more people. Cross visits may also be more costly depending on the number of farmers involved and the distance between villages. This is an issue for Laos as villages are not very close to each other. On the other hand, if cross visits require less follow-up from extension staff they might be a worthwhile short-term investment where access is difficult and regular visits from staff are not as frequent.

However this study has found that the quality of farmer to farmer exchange plays an important role in creating informed awareness so that farmers can trial new technologies with confidence. Experiences with scaling out forages in the Philippines also found cross visits were effective in providing farmers with first-hand information which complemented technical information from extension workers (Roothaert and Kaaria 2004).

It may prove more cost effective and efficient in the long run to conduct cross visits using small groups for each new village to ensure successful adaptation of technologies on a small scale. Then district staff can focus on facilitating farmer to farmer learning within a village with a reduced need for technical support. The cost of cross visits can be reduced by working within zones or districts rather than taking farmers outside districts or provinces. Of course, examples of impacts have to be available first.

Cross visits may not be for everyone. This research revealed that some farmers prefer to learn by communicating one to one (not in a group). Others may be reluctant or unable to travel outside the village. For these farmers, a district extension officer or farmer coming to visit them is more

attractive. Some farmers would rather wait for farmers in their own village to become experienced so they can learn amongst people they already know.

The role of village feedback sessions in stimulating further uptake of new technologies is less clear and needs further investigation. Although the village feedback sessions were attended by most households in the village, there were still only about 6 to 15 farmers who elected to trial forages. Further study by Sarah Whittaker, a Masters student from Massey University, New Zealand is looking at the characteristics of farmers who have not adopted forages.

A place for case studies?

Although case studies did not appear to be a preferred method for learning about using proven technologies, they may still serve the purpose of creating broad-scale awareness of a wide range of options available. Case studies reach lots of people and provide many examples but the information they provide is not as rich as when farmers can talk directly with each other in the field. Case study meetings where a champion farmer was present appeared to be more successful in gaining farmer understanding.

The quality of the case study presentation is critical. Farmers must be able to see (i.e. large, clear, colour photos and text), hear (i.e. small group meetings) and understand (i.e. ask questions, clarify, probe). Staff must be familiar with the case study (preferably their own) to answer questions. Farmers who attended case study meetings were more likely to need hard technical information and/or follow-up assistance from district staff, indicating they were still uncertain about how to use the technology. If case studies are to be used to introduce potential impacts, then they probably need to be followed by a cross visit to allow farmers to see a 'case study in action'. Technical information in hard copy could be supplied also.

Over time the need for case studies as an extension tool should decrease as more farmers become experienced with a technology in a local area, which can be easily visited or demonstrated on farm walks and at field days. Case studies may become more of a reporting tool to demonstrate impacts to funders and policy makers in government.

The role of champion farmers

Much emphasis is placed nowadays on the role of champion or case study farmers in facilitating farmer uptake of new technologies (Horne and Stür 2003; Roothaert and Kaaria 2004). Whether hosting a cross visit or taking the time to visit another village, these farmers are playing an important role in scaling out technologies. They need to be recognised and rewarded. Recognition can be in the form of increased status and role in the village or district, media coverage, payment for services or in-kind contributions. Each farmer will have different thoughts on this, and some may not want to be regarded as 'experts' or receive rewards. The important issue here is to acknowledge them in whatever manner is most appropriate for them.

If a champion farmer is keen to assist with scaling out in the long term, their role would need formalising with training in technical skills, facilitation skills and project management. If they are taking on the role of an extension agent then they need to be supported adequately.

The bigger picture

As the district and provincial staff suggested, it is important to acknowledge that many factors other than extension methods also influence farmer willingness and capacity to engage in and benefit from a new technology. Some of the factors which became evident when interviewing farmers in this study were:

1. farming system (e.g. land, income, main enterprises, problems)
2. farmer need or capacity to use forages (e.g. supplement or full diet)
3. livelihood constraints (e.g. age, labour, health, wealth, education)
4. market influences
5. level and quality of technical information, inputs and ongoing support
6. way information is delivered by district officers or champion farmers
7. information pathways (e.g. through kinship or friends or radio)
8. village leadership.

The complexity in scaling up technologies requires recognition of the social, environmental and economic processes at play. According to the Consultative Group on International Agricultural Research (2000):

It is not technologies that are scaled up, but processes and principles behind the technologies/ innovations. This is consistent with the belief that scaling out is not just replication but adaptation and learning that is flexible and interactive ... Scaling out is really about people — of communicating options to people, of a balance between introducing options and involving farmers' ability to adapt to changing contexts ... Scaling out as a development process rejects the cookie cutter approach. [It] ... achieves large numbers and wide area coverage through multiplication with adaptation ...

Hence, moving from participatory research with individual farmers to scaling out requires that researchers and extensionists develop new knowledge and skills to work with groups of farmers, understand whole farm and livelihood systems, and build networks within and between communities (Millar and Curtis 1997; Connell 2000; Harrington et al 2001; Snapp and Heong 2003). Several authors also emphasise the importance of identifying key actors who play positive influential roles in spreading innovations as well as the institutional structures and reward systems that give rise to positive outcomes whether from the private or public or non-government organisation sector (Biggs 2003; Pachio and Fujisaka 2004).

AIRP is researching the livelihood and environmental context of upland farmers in relation to farming system changes. Many of these factors are being explored in a Doctoral research project by Kim Alexander (Australia) and a Masters research project by Sarah Whittaker (New Zealand). Further research will be carried out into the institutional aspects of scaling out such as organisational learning and change.

7. Conclusions and recommendations

So what are the implications of this research for those responsible for scaling out beneficial technologies at the local, provincial or national level? District extension staff are the people at the coalface who work directly with farmers so they need to be able to meet the needs of a wide range of farmers and learning styles (not an easy task). In designing the appropriate mix of extension tools for introducing impacts to a new village, district staff must assess the strengths and weakness of each extension method at each stage of farmer learning, for each village and farmer group.

Case studies are an effective method for demonstrating options for system changes across a wide range of farming households and different areas. They can be used to reach a large audience and create initial awareness of what is possible (e.g. village meetings, field days, festival displays, conferences, VIP meetings). However, case studies take time to develop and require skills in recognising, capturing and documenting impacts. The cost of developing photos and text may be prohibitive if funds are not available for production. As this research has shown, case studies alone are not enough to enable farmers to innovate with technology. Individual farmers require follow-up technical support and opportunities for farmer to farmer learning via cross visits or group meetings.

Cross visits and champion farmer visits are more effective for rapid farmer learning about practical applications of the technology. These events can also assist farmers to solve problems and make future plans. This study found that cross visits enabled farmers to immediately apply what they had learnt due to the practical knowledge (and in some cases planting material) they had acquired. Cross visits can be useful for new villages in their first year of learning but also for more advanced farmers to share their experiences at each stage of technology adaptation.

Limiting the number of farmers on a cross visit will allow more interaction and learning between host and visiting farmers. Some villages may prefer to go as a sole group from their own village rather than joining with other groups. Cross visits rely on having appropriate impacts to demonstrate and being able to select visiting farmers who can communicate and inspire other farmers on their return. For new villages, cross visits within a district may be desirable to allow farmers to gain confidence that the technologies can work locally. For villages that are more advanced, cross visits outside the district may allow them to learn new management practices.

However, cross visits may not be for everyone. The research revealed that some farmers prefer to learn by communicating one to one (not in a group). Others may be reluctant or unable to travel outside their village. For these farmers, a district extension officer or champion farmer coming to visit them may be more attractive. They may need to learn in a step-by-step fashion. Some farmers would rather wait for farmers in their own village to become experienced so they can learn amongst people they already know. Hence, it may be better to allow a small number of success stories to establish in a village first so that other farmers can see technologies being adapted first-hand and call upon experienced farmers to assist with establishment and use.

A possible approach using a combination of methods has been proposed and will be trialled in 2005 with a few new villages:

- (i) Take three or four farmers from the new village on a cross visit to an experienced village.
- (ii) Accompany these farmers back to a village meeting where they explain their experiences with the aid of other case studies presented by district staff (or champion farmers if they happen to be useful in this particular location).
- (iii) Form a focus group in the new village and keep it *active*.

- (iv) When impacts and technical lessons start to emerge in the new village, hold a field day within the village for the focus group and other interested farmers and make sure that at each stop there are lessons to learn.
- (v) After a year or two it may be possible to run field days in the village for farmers from other nearby villages (a village cluster).

Although the aim of scaling out technologies is to reach as many potential beneficiaries as possible in the shortest time (i.e. accelerate impacts) we must ensure that the benefits are significant enough to make a difference to livelihoods. In this way, the scaling out process needs to consider the quality of impacts not just the number of farmers involved. The choice of methods can therefore be critical to achieving quality and quantity of impacts from beneficial technologies through farmer learning. Involving farmers in selecting their preferred learning methods and evaluating their progress will ensure the right mix of extension methods is used for scaling out.

Staff training and on-the-job learning needs to lead to an understanding of the stages of farmer learning and how different extension methods can influence farmer willingness and capacity to use technologies. These aspects of capacity building and organisational learning are also being researched by AIRP.

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9. Appendix 1 — Summary of study villages

	Case studies	Cross visits	Champion farmer visit
Name, district S=small animal L=large animal	Thinkeo, Xieng Ngeun (S) NaLum, Pek (S, L) PaHok, Nonghet (L)	Phongam, Luang Prabang (S) Sip Et, Xieng Ngeun (S) Had Kham, Pak Ou (S)	Phoukoua, Xieng Ngeun (S, L) Phontong, Pek (S, L) Had Kang, Pak Ou (S, L)
No. of households/village	134 38 29	31 89 64	52 46 76
Total	201	184	174
No. of total active farmers/ village	10 11 15	5 10 11	6 20 14
Total	36	26	40
% of total households	18%	14%	23%
Forage area planted by total active farmers	14,950 sq m (1.5 ha)	11,800 sq m (1.2 ha)	17,900 sq m (1.8 ha)
No. of active farmers interviewed	9	9	9
% of total active	25%	34%	23%
No. of active farmers attended meetings or cross visit	7 (+ 2 spouses)	8 (All 9 attended village feedback)	7 (1 son attended)
No. of non-active farmers interviewed	8	9	9
% of total non-active	4.8%	5.7%	6.7%
No. of non-active farmers attended meetings or cross visit	5	1 attended cross visit 6 attended village feedback	7